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SUPPLEMENTAL SOIL SAMPLING REPORT
FORMER DUTCH BOY SITE
CHICAGO, ILLINOIS

PREPARED

FOR

NL INDUSTRIES, INC.

PREPARED

BY

ENVIRONMENTAL STRATEGIES CONSULTING LLC

JULY 26, 2005

A QUANTA TECHNICAL SERVICES COMPANY

Contents

1.0 Introduction

Environmental Strategies Consulting LLC, on behalf of NL Industries, Inc. (NL), has prepared this report presenting the results of the supplemental soil sampling conducted at the former Dutch Boy site in Chicago, Illinois (Figure 1). The objectives of the supplemental sampling were to confirm the findings of the re-assessment survey and soil screening activities conducted at the site in June 2003 and evaluate lead concentrations in soil in areas not previously investigated. A Sampling and Analysis Plan (SAP) for the supplemental sampling was submitted to the U.S. Environmental Protection Agency EPA (EPA) Region V on February 15, 2005, and approved by EPA on February 24, 2005. Access to the property was obtained from the City of Chicago on May 21, 2005.

The supplemental sampling was conducted on June 6 and 7 and July 5, 2005. Site surface conditions were photographed and recorded. Samples were collected from a total of 22 locations (ESC-28 through ESC-49) and analyzed to obtain data on the concentrations of lead in soil in areas previously assessed in June 2003, where concrete had been removed by the City of Chicago and its contractor Tetra Tech. All sampling and analysis conformed to EPA Region V guidance regarding sample sampling, quality assurance/quality control, data validation, and chain of custody procedures, as specified in the SAP. The data obtained was used in combination with the results of the June 2003 re-assessment to delineate areas of uncovered soil where lead concentrations exceed the risk-based cleanup goal of 1,400 milligrams per kilogram (mg/kg) established pursuant to the Unilateral Administrative Order (UAO) issued to NL by the EPA on March 26, 1999.

A summary of the site background including previously-completed site cleanup activities and the June 2003 Site Re-Assessment sampling is provided in Section 2. The supplemental sampling activities are described in Section 3. Section 4 presents the supplemental sampling results and provides estimates of the size of the areas where lead concentrations are above 1,400 mg/kg and the estimated volume of soil in these areas.

2.0 Site Background

2.1 Site Location and Description

The former Dutch Boy facility is located at 12000 to 12054 South Peoria Street and 901 to 935 West 120th Street, Cook County, Chicago, Illinois (Figure 1). The 5.25-acre property is bordered to the north by West 120th Street, a vacant lot, and a fire station, to the east by South Peoria Street and a vacant lot, to the south by rail lines of the Illinois Central Gulf Railroad, and to the west by a vacant lot. All buildings and most of the foundations on the property have been removed. An above-grade concrete loading dock is present along the southern portion of the property, and at-grade concrete slabs are present on the southwest and northern portions of the property. A ponded area surrounded by concrete rubble is present on the western portion of the site. The pond was not present at the completion of the 1999 remedial actions conducted at the site. The property is surrounded by 6-foot-high chain-link fencing. The nearest residential areas are 300 to 500 feet north, east, and south of the Site. Figure 2 shows the site plan.

2.2 Geology and Hydrogeology

The Site geology and hydrogeology are described in the Remedial Design/Remedial Action (RD/RA) Work Plan (1999), which included a Quality Assurance Project Plan (QAPP) and a site-specific Health and Safety Plan (HASP). In summary, the geology of the site consists of up to 4 feet of fill overlying fine-grained sand. Groundwater is present at approximately 4 feet below the ground surface (bgs).

2.3 Climate

The climate in the vicinity of the Site is described in the RD/RA.

2.4 Previous Environmental Investigations

In 1999, NL Industries, Inc., conducted soil remediation at this site, in accordance with the terms of the March 26, 1996, Unilateral Administrative Order (UAO) issued to NL by the U.S. Environmental Protection Agency (EPA). NL also conducted supplemental remedial actions at the Site in accordance with the June 9, 1999, Consent Decree (CD) between the City of Chicago and NL. The remedial work completed included excavation of lead-impacted soil

from onsite unpaved surface areas, the offsite parkway area, and from limited onsite paved surface areas, in addition to other actions. At the conclusion of this work in 1999, excavated areas were backfilled with clean, imported fill material, while the remainder of the site remained capped with existing concrete pavement and foundations, in accordance with the terms of the UOA and the CD. Subsequent to the completion of the 1999 site remedial actions, large portions of the concrete cap were removed by the City of Chicago and its contractor Tetra Tech, and the underlying soil was exposed in the central portion of the site. Supplemental testing addressed those discrete portions of soil that were exposed when the City of Chicago and its contractor Tetra Tech removed the concrete cap.

Between July 2000 and February 2001, the City of Chicago and its contractor Tetra Tech removed the majority of the concrete foundations that had been left in place. Tetra Tech EM, on behalf of the City of Chicago, conducted additional soil and groundwater sampling at the Site in May 2001. In September 2001, on behalf of the EPA, Tetra Tech conducted additional soil sampling on the Site.

In June 2003, Environmental Strategies collected soil samples from 27 borings, located where the concrete pavement or foundations had been removed in 2000 and 2001, and where Tetra Tech had identified areas of soil with elevated lead concentrations. Composite soil samples at 1-foot intervals were screened for lead using an X-ray fluorescence (XRF) detector, in accordance with procedures approved by the EPA. Selected soil samples were also analyzed for lead at an offsite EPA-accredited laboratory using EPA Method 6010B. Tables 1 and 2 present the analytical results. Figure 3 displays the locations and lead concentrations for the 2001 and 2003 borings.

The 2003 re-assessment activities identified lead concentrations greater than 1,400 mg/kg in 14 of the 27 soil borings in the areas that had been previously covered by building foundations. These areas are designated "A", "B", "C", and "D" on Figures and 3. The majority of the samples from the 27 borings were analyzed onsite using an XRF detector.

3.0 Supplemental Sampling

3.1 Scope of Supplemental Sampling

The scope of the supplemental sampling was to collect soil samples at 35 locations in Areas A, B, C and D as well as near previously-sampled locations in these areas (Figure 4). In Area A, the majority of samples were to be collected to the north of previous samples from a grid with a 30-foot spacing. In area C, the sampling grid was to be spaced approximately 20 feet apart. In addition, samples were to be collected in the general location of previous samples designated ESC-03, ESC-06, ESC-09, ESC-10, ESC-18, ESC-19, ESC-20, ESC-23, ESC-24, ESC-25, and RSB-15 to confirm the previous findings.

The actual sampling involved collecting soil samples at a total of 22 locations. The presence of piles of concrete rubble and a ponded area to the west of Area A prevented the collection of samples from this area. The SAP also specified that boring ESC-05 was to be replicated; however, the location was under a rubble pile and was inaccessible. The locations of the replicate borings (designated with an "A" suffix) and of borings ESC-28 through ESC-49 are shown on Figure 4.

3.2 Soil Sample Collection and Analysis

A Geoprobe direct-push rig was used to collect soil samples. At each location continuous soil samples were collected using a 4-foot-long, 2-inch-diameter sampler fitted with a new plastic liner. The depth of the borings was 4 feet below ground surface (bgs) in accordance with the work plan approved by the EPA. Upon recovery, the liner was removed from the sampler and split open using a utility knife. The boring location and the sample description were recorded in a field book.

Composite samples were collected from each 1-foot depth interval. The soil was homogenized in accordance with the SAP. A representative split of the homogenized sample was placed in glass jars provided by Severn Trent Laboratories (STL). A split of the homogenized sample was collected by Tetra Tech, the consultant for the City of Chicago. The remaining soil was replaced in the borehole, which was then filled with bentonite chips to the surface.

The samples were transported to STL in University Park, Illinois, and analyzed for lead using EPA Method 6010B. The composite samples collected below 1 foot bgs were placed on

hold, and successive depths were analyzed if the lead concentration in the overlying sample were above the 1,400 mg/kg criterion.

3.3 Quality Assurance/Quality Control Procedures

Quality assurance/quality control (QA/QC) samples consisting of an equipment blank and field duplicate samples accompanied the soil samples. The field duplicate samples were collected for every 20 samples analyzed by the laboratory to provide a check of the reproducibility of the analytical results. The duplicate samples were collected from ESC-18/2-3' (designated ESC-102), ESC-36/0-2' (designated ESC-136), ESC-40/2-3' (designated ESC-105), and ESC-48/1-2' (designated ESC-148). Each duplicate sample was analyzed for lead.

Equipment blank EB070505 was collected as a QC check of the decontamination procedures for the sampling equipment. The equipment blank was prepared by pouring laboratory-provided analyte-free water through the sampling equipment, collecting the rinsate in a plastic bottle, and preserving with nitric acid.

3.4 Equipment Decontamination

All samplers and rods were decontaminated in the field between each use by washing with a solution of non-phosphate detergent to remove all visible material, then rinsing with tap water. The wash water and rinse water were poured onto the ground at the property and allowed to infiltrate into the underlying soil.

4.0 Sampling Results

The analytical results for the 2005 soil samples are presented in Table 3 and shown in black in Figure 4. For comparison purposes, the XRF screening results for the samples collected in June 2003 are presented in Table 1 and Table 2 presents the laboratory results for selected samples collected in 2003. The sampling results for the June 2003 re-assessment are shown on Figure 3 and the supplemental sampling results are shown on Figure 4 and are discussed below. The analytical results for the samples collected in 2001 by Tetra Tech EM, Inc., on behalf of the City of Chicago, are shown in blue italics on the figures.

4.1 Area A

Area A is located in the west-central portion of the site. Soil samples were collected from eight locations in this area (RSC-15A, ESC-9A, ESC-10A, ESC-25A, ESC-34, ESC-35, ESC-36, and ESC-37). Lead concentrations in the 13 samples that were analyzed ranged from 40 mg/kg to 27,000 mg/kg. Lead at concentrations above 1,400 mg/kg was detected in 5 of the 13 samples.

Figure 4 depicts the estimated horizontal limits of soil containing lead concentrations above 1,400 mg/kg in Area A. The estimated southern limit of lead concentrations in soil above 1,400 mg/kg in Area A is slightly less than was estimated in 2003, based on replicate boring ESC-25A. Lead concentrations in the two samples collected from this boring were 280 mg/kg at 1 to 2 feet bgs and 240 mg/kg at 2 to 3 feet bgs. The June 2003 XRF screening measurement at this location reported lead at a concentration of 3,240 parts per million (ppm) at 1 to 2 feet bgs. The estimated northern limit of lead concentrations above 1,400 mg/kg in Area A is greater than estimated in 2003, based on the results for borings ESC-36 and ESC-37. The extent of lead in soil above 1,400 mg/kg in the western portion of Area A could not be verified in the supplemental sampling due to the presence of the ponded area and concrete rubble piles. However, soil west of the former foundation was excavated in 1999 in accordance with approved plan. As well, the maximum XRF lead concentration measured in June 2003 at ESC-12 was 188 ppm, indicating that the area was not impacted at that time.

Based on the results of the supplemental sampling and the June 2003 re-assessment, the estimated area with soil lead concentrations above 1,400 mg/kg in Area A is 12,600 square feet.

The maximum depth to which lead concentrations in Area A were above 1,400 mg/kg is 3 feet bgs.

4.2 Area B

Area B is located to the south of Area A and extends across the former below-grade pipe tunnel (now exposed and filled with water). Soil samples were collected from 11 locations in this area as part of the supplemental sampling (ESC-38 through ESC-44, ESC-46, ESC-47, ESC-18A, and ESC-19A). Lead concentrations ranged from 13 mg/kg to 34,000 mg/kg. Lead at concentrations above 1,400 mg/kg was detected in 5 of 18 samples that were analyzed.

Based on the results of the supplemental sampling and the June 2003 re-assessment, the estimated area with soil lead concentrations above 1,400 mg/kg in Area B is approximately 4,600 square feet. This is larger than the size of Area B estimated in 2003. The maximum vertical limit to which lead concentrations are above 1,400 mg/kg is 3 feet bgs.

4.3 Area C

Area C is located in the east-central portion of the site in the vicinity of the former mill building. Soil samples were collected from one location in this area as part of the supplemental sampling (ESC-3A). Lead at concentrations above 1,400 mg/kg was detected in all three samples collected from ESC-3A.

The limits of lead concentration in soil above 1,400 mg/kg in Area C are defined by borings SB-23, ESC-02, ESC-03, ESC-04, and ESC-05. Based on the results of the supplemental sampling and June 2003 re-assessment, the estimated area with soil lead concentrations above 1,400 mg/kg in Area C is approximately 10,000 square feet.

The maximum lead concentration in soil from borings ESC-28 through ESC-33, which were installed to the south of Area C, was 320 mg/kg. Lead-impacted soil was removed from this area in 1999. The 2005 results indicate that the area to the south of Area C has not been affected by the placement and subsequent removal of debris following the 1999 removal action.

4.4 Area D

Area D is located on the southern portion of the area where the concrete surface was removed following the 1999 remedial action. Samples were collected from one location (ESC-

23A) to verify the June 2003 re-assessment screening result at ESC-23. Lead concentrations were 25 mg/kg at 1 to 2 feet bgs and 16 mg/kg at 2 to 3 feet bgs.

Based on the results of the supplemental sampling, Area D does not contain lead concentrations above the 1,400 mg/kg criterion and does not warrant further action.

4.5 Miscellaneous Area

The June 2003 XRF screening results identified an area in the central portion of the site centered on boring ESC-06 where lead was detected, using the XRF detector, above 1,400 mg/kg at 2 to 3 feet bgs. One boring was installed in this area (ESC-06) and three samples were collected from different depth for laboratory analysis of lead. Lead concentrations in the samples were 310 mg/kg at 0 to 1 feet bgs, 350 mg/kg at 1 to 2 feet bgs, and 1,100 mg/kg at 2 to 3 feet bgs. Based on the results of the supplemental sampling, soil in this area does not contain lead concentrations above the 1,400 mg/kg criterion and does not warrant further action.

4.6 Northern Property Boundary

No additional samples were collected along the northern boundary of the site where lead was measured above 1,400 ppm in XRF screening conducted in June 2003. This area is represented by ESC-15 and ESC-16 and a previous sample collected by Tetra Tech (SB-1). As indicated in the August 2003 re-assessment report, a conservative estimate of the area with lead concentrations above 1,400 mg/kg is approximately 3,200 square feet.

Summary of Potential Remediation Areas

Location	Approximate Dimensions
Area A	140 ft x 90 ft
Area B	130 ft x 35 ft
Area C	100 ft x 100 ft
North Boundary	160 ft x 20 ft

Figures

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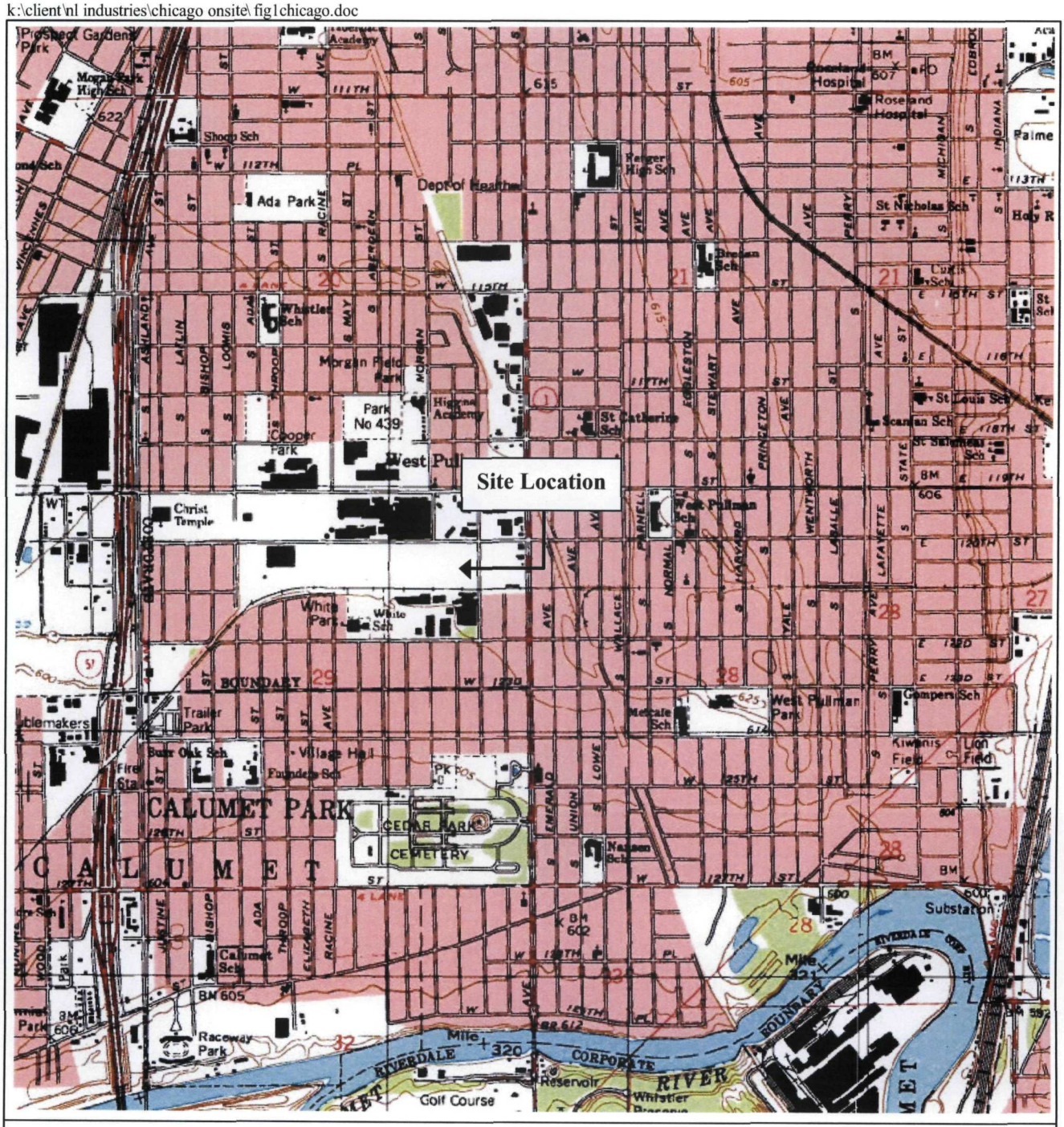

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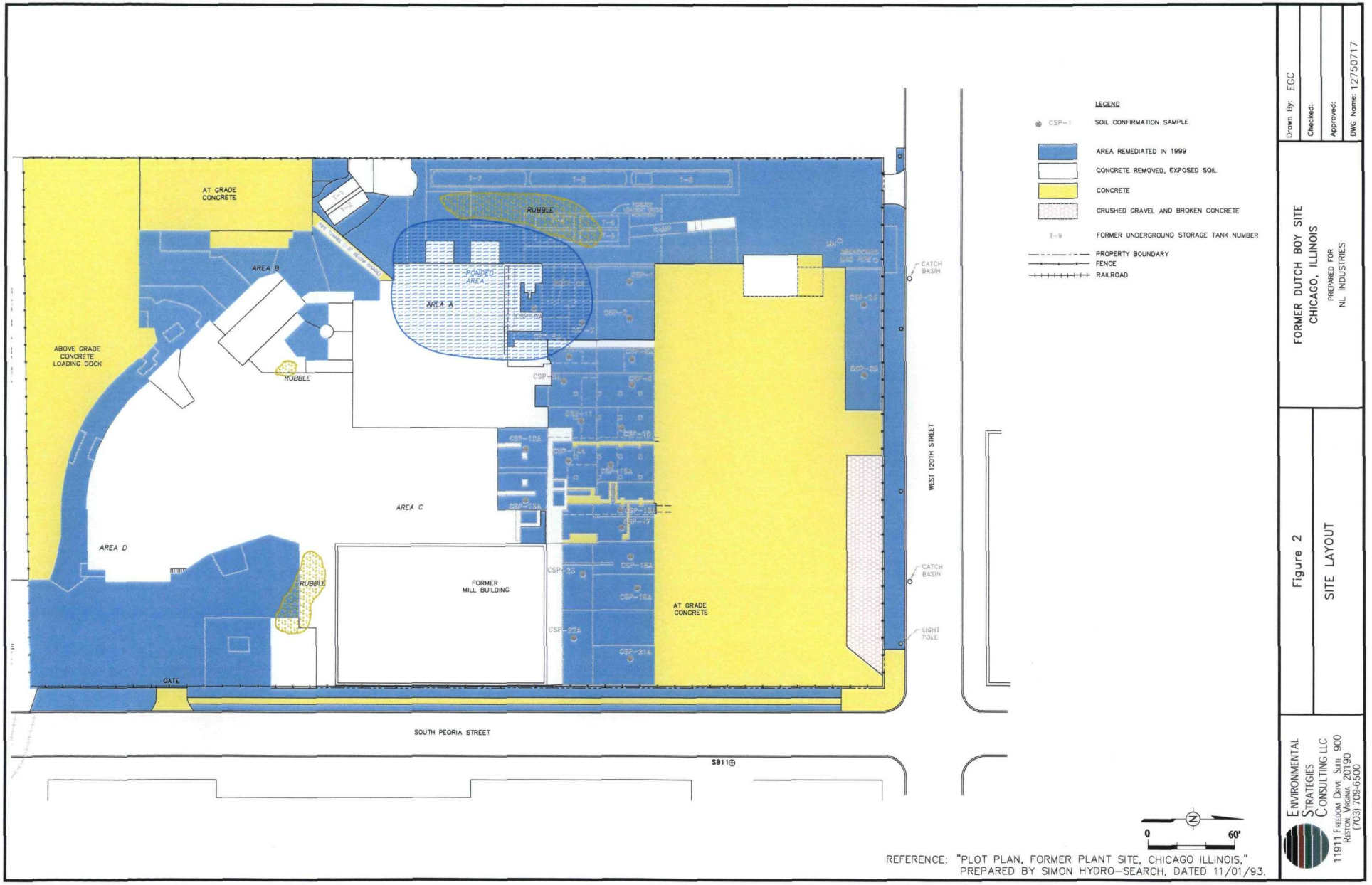
Figure 1
Site Location
Former Dutch Boy
Chicago, Illinois



REFERENCE: "PLOT PLAN, FORMER PLANT SITE, CHICAGO ILLINOIS," PREPARED BY SIMON HYDRO-SEARCH, DATED 11/01/93.

Drawn By: EGC
Checked:
Approved:
DWG Name: 12750717

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Figure 2
SITE LAYOUT

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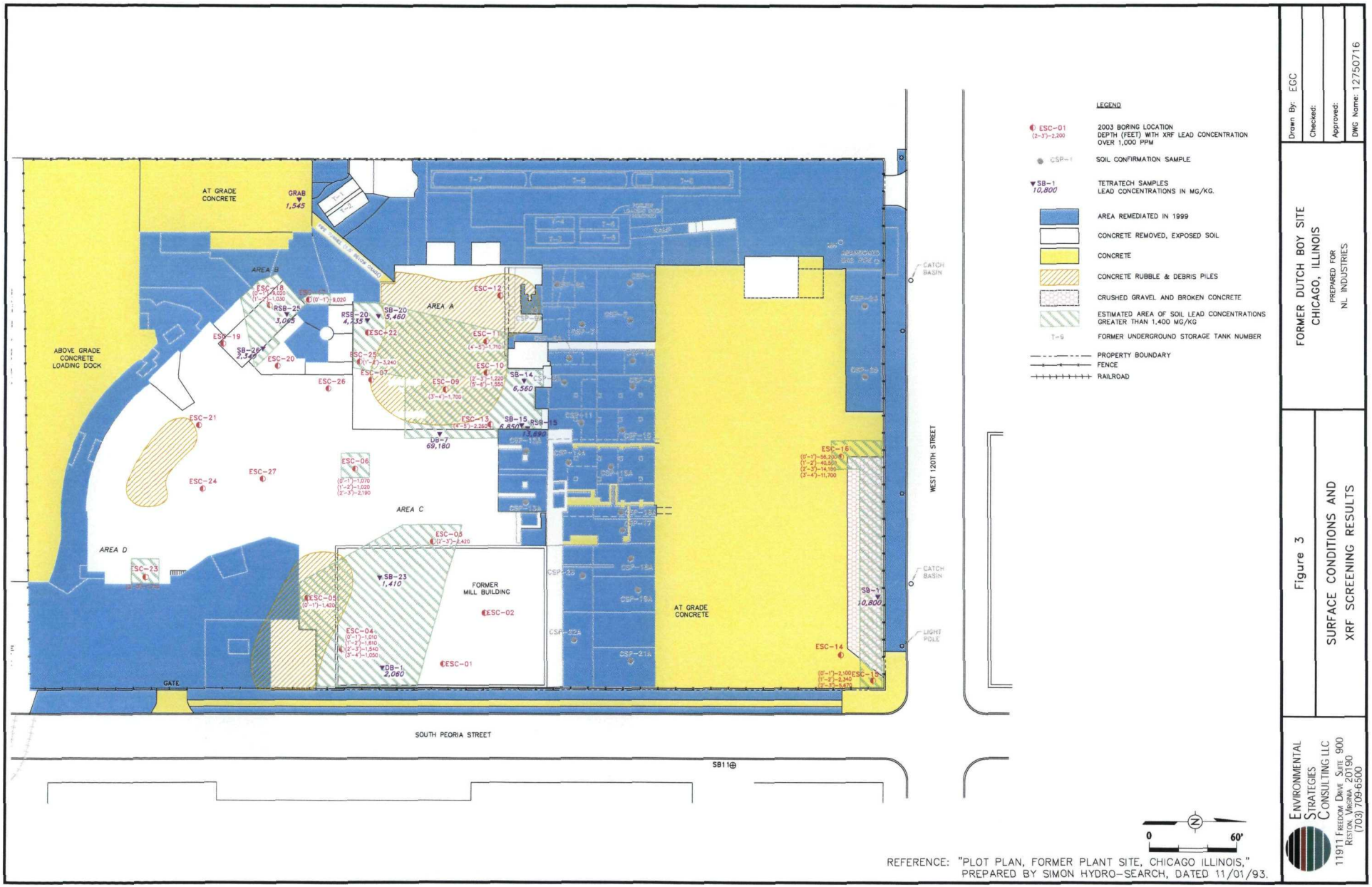

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DWG Name: 12750716

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Figure 3

SURFACE CONDITIONS AND
XRF SCREENING RESULTS

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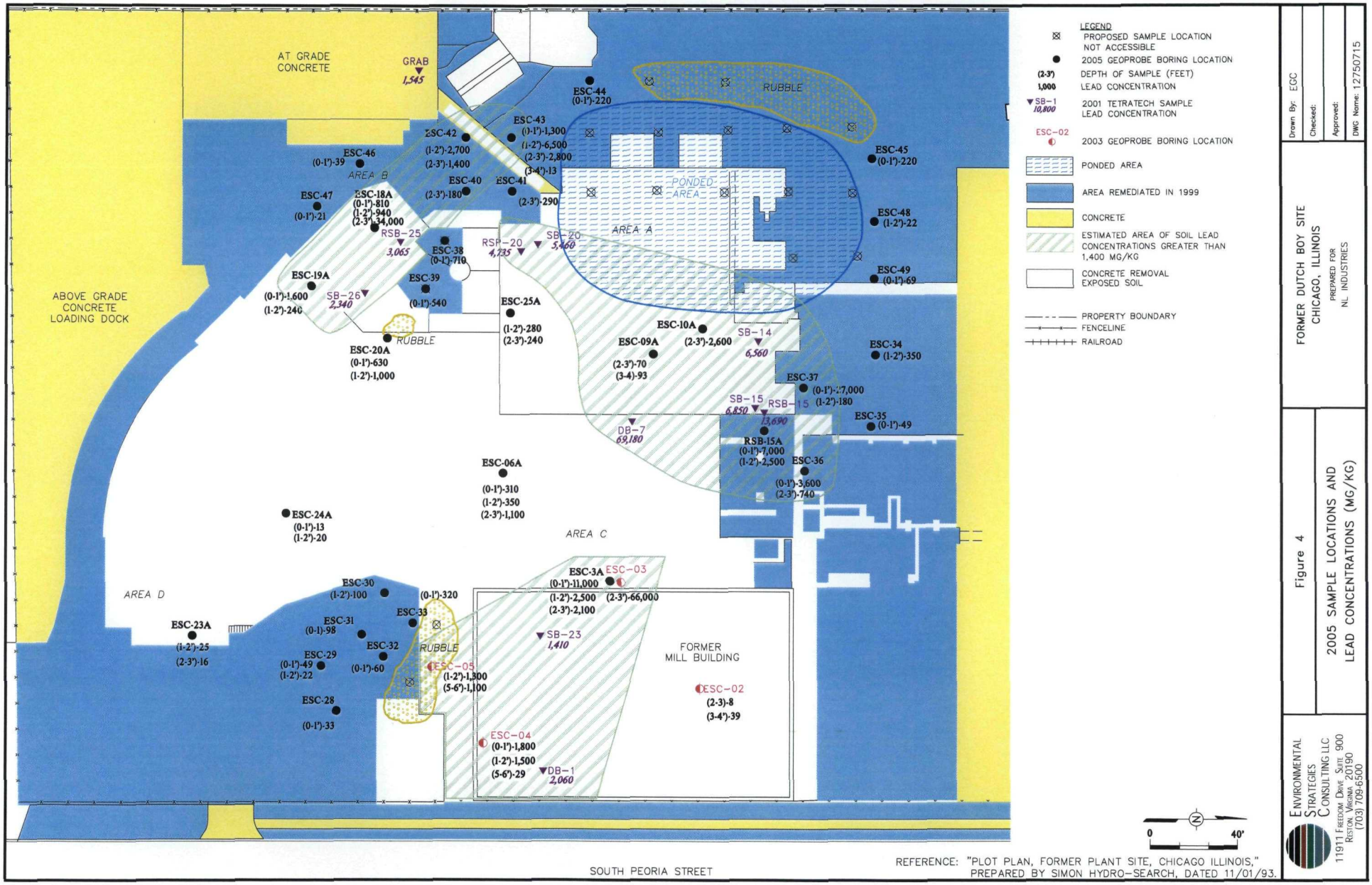

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Figure 4

2005 SAMPLE LOCATIONS AND LEAD CONCENTRATIONS (MG/KG)

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Tables

Table 1

XRF Screening Results for Lead in Soil (ppm)
Former Dutch Boy Site, Chicago, Illinois
June 2003

Depth (feet)	0-1	1-2	2-3	3-4	4-5	5-6
ESC-01	<54	<82	<93	<95	<78	<76
ESC-02	107	<87	169	285	<67	<69
ESC-03	<76	<68	2,420	<66	<69	<80
ESC-04	1,010	1,610	1,540	1,050	<94	<89
ESC-05	1,420	829	882	<130	654	326
ESC-06	1,070	1,020	2,190	570	337	229
ESC-07	529	478	<110	70	97	<81
ESC-09	<74	370	<100	1,700	136	<89
ESC-10	523	558	1,220	799	890	1,550
ESC-11	634	659	924	910	1,710	---
ESC-12	188	<120	<130	<81	<96	<88
ESC-13	<92	191	121	229	2,260	345
ESC-14	810	<120	<90	792	173	190
ESC-15	2,100	2,340	5,670	672	---	---
ESC-16	56,200	40,500	14,100	11,700	---	---
ESC-17	9,020	252	<82	<91	78	<83
ESC-18	2,690	1,030	293	148	<130	226
ESC-19	<96	128	<66	131	<77	<69
ESC-20	764	<81	567	114	284	177
ESC-21	104	719	146	---	---	---
ESC-22	242	133	967	---	---	---
ESC-23	561	368	1,710	<86	<75	<91
ESC-24	233	303	<120	403	182	188
ESC-25	514	3,240	193	222	216	167
ESC-26	177	240	275	203	<72	<64
ESC-27	387	404	<95	<72	1,220	<71

a/ --- = not measured due to poor recovery.

Table 2

Analytical Results for Lead in Soil - 2003
Former Dutch Boy Site
Chicago, Illinois

Boring	Depth (feet)	Lead (mg/kg)
ESC-01	5-6	7.5
ESC-02	2-3	8.1
ESC-02	3-4	39
ESC-03	2.5-3.5	66,000
ESC-04	0-1	1,800
ESC-04	1-2	1,500
ESC-04	5-6	29
ESC-05	1-2	1,300
ESC-05	5-6	1,100
ESC-06	2-3	1,100

Table 3

Analytical Results for Lead in Soil - 2005
Former Dutch Boy Site
Chicago, Illinois

Boring	Depth (feet)	Lead (mg/kg)		Boring	Depth (feet)	Lead (mg/kg)	
RSB-15A	0-1	7,000		ESC-34	1-2	350	
RSB-15A	1-2	2,500		ESC-35	0-1	49	
ESC-3A	0-1	11,000		ESC-136	0-1	3,900	(b)
ESC-3A	1-2	2,500		ESC-36	0-2	3,600	
ESC-3A	2-3	2,100		ESC-36	2-3	740	
ESC-06A	0-1	310		ESC-37	0-1	27,000	
ESC-06A	1-2	350		ESC-37	1-2	180	
ESC-9A	2-3	70		ESC-38	0-1	710	
ESC-9A	3-4	93		ESC-39	0-1	540	
ESC-10A	2-3	2,600		ESC-40	2-3	180	
ESC-18A	0-1	810		ESC-105	2-3	680	(c)
ESC-18A	1-2	940		ESC-41	2-3	290	
ESC-18A	2-3	34,000		ESC-42	1-2	2,700	
ESC-102	2-3	5,200	(a)	ESC-42	2-3	1,400	
ESC-19A	0-1	1,600		ESC-43	0-1	1,300	
ESC-19A	1-2	240		ESC-43	1-2	6,500	
ESC-20A	0-1	630		ESC-43	2-3	2,800	
ESC-20A	1-2	1,000		ESC-43	3-4	13	
ESC-23A	1-2	25		ESC-44	0-1	220	
ESC-23A	2-3	16		ESC-45	0-1	220	
ESC-24A	0-1	13		ESC-46	0-1	39	
ESC-24A	1-2	20		ESC-47	0-1	21	
ESC-25A	1-2	280		ESC-48	1-2	22	
ESC-25A	2-3	240		ESC-148	1-2	21	(d)
ESC-28	0-1	33		ESC-49	0-1	69	
ESC-29	0-1	49					
ESC-29	1-2	22					
ESC-30	1-2	100					
ESC-31	0-1	98					
ESC-32	0-1	60					
ESC-33	0-1	320					

a/ Duplicate of ESC-18/2-3'.
b/ Duplicate of ESC-36/0-2'.
c/ Duplicate of ESC-40/2-3'.
d/ Duplicate of ESC-48/1-2'.

Appendix A – Laboratory Reports and QA/QC Evaluation